

WHAT IS CLAIMED IS:

1. An encoder for measuring the position of a surface, said encoder comprising:

5 a first array of n photodetectors, where $n > 1$, each photodetector being characterized by
a width d_1 ;

10 a first code strip imaging system for generating an image from a first code strip
attached to said surface on said first array, said image comprising alternating dark and light
stripes, said stripes having a width of D_1 , said dark stripes having a lower luminosity than
said white stripes, wherein $nd_1 = D_1$, said code strip image moving in a first direction with
respect to said first array, said distances d_1 and D_1 being measured in a direction parallel to
said first direction;

15 a second array of n photodetectors, each photodetector being characterized by a width
 d_2 ; and

20 a second code strip imaging system for generating an image from a second code strip
attached to said surface on said second array, said image comprising alternating dark and light
stripes, said stripes having a width of D_2 , wherein $nd_2 = D_2$, said code strip image moving in a
first direction with respect to said first array, said distances d_2 and D_2 being measured in a
direction parallel to said first direction, wherein $d_1 = nd_2$.

25 2. The encoder of Claim 1 further comprising a plurality of detector circuits, each
detector circuit converting a light intensity signal from a corresponding one of said
photodetectors to a channel signal that switches between first and second logic states when
said code strip moves relative to said array.

30 3. The encoder of Claim 2 further comprising a decoding circuit for receiving said
channel signals and generating a digital signal that increases monotonically with the position
of said code strip relative to a reference point.

4. The encoder of Claim 2 wherein said first array of n photodetectors further comprises a complementary array of n photodetectors, each photodetector in said complementary array being characterized by a width d_1 , said complementary array of photodetectors being positioned relative to said first array of photodetectors such that each 5 photodetector in said complementary array of photodetectors generates a light intensity signal that is a complement of said light intensity signal generated by a corresponding one of said photodetectors in said first array.